REMARKS

The specification is objected to as failing to provide proper antecedent basis for claims 15 and 38. The specification has now been amended to provide such basis, and no new matter is believed to have been introduced by the amendment.

Claims 14, 15, 37, 38 are rejected under 35 U.S.C. § 112 as being indefinite. Specifically, these claims are objected to on the ground that there is no reference for the values of the angles claimed. These claims have now been amended to indicate that the values of the angles are in reference to a normal direction to the top surface. The rejection is therefore believed to have been overcome.

Claims 1-5, 10, 14, 16-22, 24, 26, 27, 32 and 39 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,740,079 to Koizumi et al. The rejection is traversed insofar as it is applied to the claims presently standing.

Claims 1 and 24 now require that the first radiation beam has an ultraviolet or deep ultraviolet wavelength. Koizumi et al. does not disclose or suggest that either one of its two wavelengths is within the ultraviolet or deep ultraviolet spectrum. The Examiner admits this to be the case in the second paragraph of item 6 on page 4 of the Office Action.

It is believed to be well settled that, in order to anticipate, there must be identity of elements between the anticipating reference and the elements of the rejected claim. Since Koizumi et al. fails to teach that either one of the two wavelengths is within the ultraviolet or deep ultraviolet spectrum, there is no identity of elements between Koizumi et al. and claims 1 and 24. Therefore, these two claims are not anticipated by Koizumi et al.

The use of ultraviolet or deep ultraviolet radiation permits a user to confine the region inspected to only a surface portion of a substrate. This is due to the fact that ultraviolet or

deep ultraviolet radiation only penetrates the substrate to a shallow depth so that detection using ultraviolet or deep ultraviolet radiation would not be affected by deeper features. See paragraphs 14 and 35 of the specification, for example. Such advantages of using ultraviolet or deep ultraviolet radiation are not taught or suggested by Koizumi et al.

Koizumi et al. disclose a low angle S-polarized illuminating light beam 15L at wavelength λ_1 and a high angle S-polarized illuminating light beam 15H at wavelength λ_2 applied at the same point on the specimen. Only P components are detected and compared by detector arrays 20H and 20L. Thus, as explained by Koizumi et al. in reference to Figs. 43, 44a, 44b and column 2, when the S-polarized illumination beam is supplied to the sample at an oblique angle, the pattern such as line 2 will scatter light in the beam without changing its polarization, whereas a particle will convert part of the S-polarized light into P-polarized light. By detecting the P component that is scattered by the sample, Koizumi et al. attempts to distinguish between pattern and particle.

Koizumi et al. employs high angle illumination light beams to emphasize the detection of pattern and low angle illumination light beams to emphasize the detection of particles. See, for example, Figs. 18(a)-18(g), and column 9, lines 61-66. Koizumi et al. then uses two different wavelengths in order to enable the detection results using high angle illumination to be distinguished from the detection results using low angle illumination. There is therefore no reason or motivation for Koizumi to modify the system in order to employ ultraviolet or deep ultraviolet radiation just to distinguish between illumination at high and low angles of incidence. The reason given by the examiner, namely the detection of small particles, is not mentioned at all by Koizumi et al. If the Examiner believes otherwise, it is respectfully requested that the Examiner explain in detail the reason and motivation for such modification.

Based on the above, it is believed that claims 1 and 24 are also non-obvious over Koizumi et al. Claims 1 and 24 are therefore believed to be allowable.

Claims 3-5, 10, 14, 16-22, 26, 27, 32 and 39 are believed to be allowable since they depend from allowable claims. They are further believed to be allowable because of the features in these claims. For example, claim 5 adds the limitation that radiation detected from the first radiation beam is compared to that detected from the second radiation beam to determine whether the anomaly comprises a COP or a particle. This is radically different from Koizumi et al., contrary to the opinion of the Examiner. The Examiner is of the opinion that Fig. 18 of Koizumi et al. teaches such feature. Page 3, second paragraph, of the Office Action. Applicants respectfully disagree. As known to those skilled in the art, pattern on semiconductor wafers is very different from COPs. Pattern typically comprises structures intentionally deposited or otherwise fabricated on the surface of the semiconductor wafer when electronic devices are made, whereas COPs are defects on the surface of a semiconductor wafer when such wafer is manufactured and prior to the making of any electronic devices. Since pattern is something that is purposely deposited or otherwise fabricated on the surface of the wafer, the presence of the pattern itself is not regarded as a defect. COPs, on the other hand, are defects that may cause malfunction in the electronic devices. Thus, the invention of claim 5 is intended to solve an altogether different problem than that solved by Koizumi et al.'s device as explained below.

In Koizumi et al., when wafers with patterns thereon are inspected for particle defects, the pattern will also scatter light so that the scattering from pattern may obscure or overwhelm the scattering from the particles, rendering particle detection difficult. The problem to be solved by claim 5, on the other hand, is to distinguish COPs from particles. COPs may be caused by different manufacturing processes. For example, COPs may be caused by

processes such as those used in producing the bare silicon wafer, whereas particles may be caused by other manufacturing processes. Therefore, if one is able to distinguish between COPs and particles, it is then possible to identify the source of the defects so that appropriate corrective measures may be taken to avoid such defects in manufacturing. COPs and particles call for different types of remedies. Particle defects may be remedied by recleaning the wafer surface, whereas COPs are not removed by recleaning. Therefore, if COPs are erroneously identified as particles, the recleaning of the wafer surface will not remove the defects.

In view of the very different purposes and goals sought to be achieved by the invention of claim 5 versus that of Koizumi et al., it is believed that claim 5 is non-obvious and therefore allowable over Koizumi et al.

In rejected claims 10 and 32, while Koizumi et al. teaches the use of radiation in the visible spectrum, it fails to teach or suggest the use of two radiation beams, one in the ultraviolet or deep ultraviolet range and the other in the visible range. As clearly explained in the specification, the use of radiation beams with such wavelengths allows the user to distinguish between surface anomalies and subsurface anomalies. Ultraviolet or deep ultraviolet radiation penetrates the substrate only to a shallow depth so that it may be used to inspect the surface of the substrate, while the visible radiation in the second beam can penetrate into a substrate for detection of deeper anomalies underneath the surface. Using data gathered from both wavelengths allows a user to discern whether a detected anomaly is located at the surface of the substrate or within the substrate. See ¶¶ 35 and 36 of the specification. This is not taught or suggested at all by Koizumi et al.

As to claim 14, the Examiner points to the disclosure of 2° from the horizontal plane in column 18, lines 49-50 of Koizumi et al. An angle of 2° from the horizontal plane is very

different from and does not teach or suggest an angle of 70° from the normal direction. If the Examiner disagrees, it is respectfully requested that the Examiner explain in detail why this rejection can be maintained.

In regard to claim 26, Koizumi et al. clearly fails to teach or suggest a collector that is rotationally symmetric about a line and that is operable to collect radiation and focus the radiation onto the detector.

Claims 6-9, 11-13, 15, 23, 25, 28-31, 33-34 and 40-45 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Koizumi et al. in view of U.S. Patent No. 4,449,818 to Yamaguchi et al. The rejection is respectfully traversed.

The Examiner is of the opinion that, even though Koizumi fails to teach or suggest the use of wavelengths in the ultraviolet spectrum of radiation, it would have been obvious to use a wavelength in the ultraviolet spectrum if small particles are detected. For reasons similar to those above for claims 1 and 24, it is believed it would not have been obvious to modify Koizumi et al. to use ultraviolet radiation instead. Therefore, claims 6, 7, 8, 28, 29, 43 and 44 are believed to be allowable. For reasons similar to those explained above for claims 10 and 32, claims 9-13, 31-35 and 23 are believed to be allowable.

Claim 37 is believed to be allowable for the same reasons as those explained above for claim 14. Contrary to the Examiner, Yamaguchi et al. do not appear to disclose the feature of claim 37.

In regard to claim 41, the Examiner is of the opinion that it would have been obvious to use Koizumi et al. for the purpose of detecting defects on the top surface and within the substrate because the device would function in the same manner. See second to the last paragraph on page 4 of the Office Action. Applicants respectfully disagree. Koizumi et al.

apparently contains no disclosure whatsoever concerning a determination as to whether the anomaly is located on the top surface or below the top surface of the substrate. Koizumi et al. fails to address this issue at all. As explained above, in one embodiment of the invention, this is accomplished as taught by the specification by using ultraviolet radiation in the first beam and visible radiation in the second beam.

As for claim 45, the Examiner is of the opinion that column 18, lines 55-59 of Koizumi et al. teaches such feature. Applicants respectfully disagree. Column 18, lines 55-59 of Koizumi et al. contains no such feature at all. All such section of Koizumi refers to are patterns made of two different materials (polycrystalline Si and SiO_2) when they are measured. Presumably, both types of patterns are on a silicon substrate or substrates. Therefore, there is no disclosure in such section of Koizumi of a structure with silicon on an insulator type wafer. Such section of Koizumi et al. merely teaches a polycrystalline silicon pattern on a silicon substrate or a silicon dioxide pattern on a silicon substrate, rather than having a layer of silicon on top of an insulator.

Certain claims of the application are rejected under the obviousness-type double patenting as being unpatentable over certain claims of U.S. Patent No. 6,201,601 and copending application No. 09/746,141. Attached is a terminal disclaimer with respect to U.S. Patent No. 6,201,601 and copending application No. 09/746,141. The double patenting rejection is therefore believed to have been overcome.

Claims 46-85 have been added to more completely claim the invention of this application.

Claims 1, 3- 29, 31-85 are presently pending in the application. Reconsideration of the rejections is respectfully requested, and an early indication of the allowability of all the claims is earnestly solicited.

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Respectfully submitted,

James S. Hsue
Attorney for Applicants
Reg. No. 29,545

Version with markings to show changes made

IN THE SPECIFICATION:

[0033] After radiation beam 404 passes through objective 406 and filter 408 of the spatial filter, a collimating objective 410 collimates radiation beam 404 and directs it to a beam splitter 412. Beam splitter 412 passes a first radiation component 414 of radiation beam 404 to a normal illumination channel 416, and a second radiation component 418 to an oblique illumination channel 420. In other words, illumination channel 416 is at around zero degrees to a normal direction to surface 426. According to an embodiment of the invention, first radiation component 414 and second radiation component 418 have different wavelengths. Therefore, beam splitter 412 passes radiation at a first wavelength on to normal illumination channel 416, and passes radiation at a second wavelength on to oblique illumination channel 420.

IN THE CLAIMS:

1. (Amended) A method for detecting an anomaly on a top surface of a substrate, or within the substrate, comprising:

directing a first radiation beam having a first ultraviolet or deep ultraviolet wavelength ~~at~~ to illuminate a first spot on the top surface of the substrate at a first non-zero angle measured from a ~~the~~ normal direction to the top surface;

directing a second radiation beam having a second wavelength ~~at~~ to illuminate a second spot on the top surface of the substrate at a second angle measured from ~~the~~ a normal direction to the top surface, wherein the second wavelength is not equal to the first wavelength;

causing relative motion between the first and second radiation beams and the top surface of the substrate so that the spots scan paths on the top surface;

detecting radiation from the first radiation beam scattered by the top surface in the first spot to provide a single output corresponding to a position of the first spot on the top surface; and

detecting radiation from the second radiation beam scattered by the top surface in the second spot to provide a single output corresponding to a position of the second spot on the top surface.

2. Cancelled. ~~The method of claim 1, further comprising causing relative motion between the first and second radiation beams and the top surface of the substrate.~~

3. The method of claim 1, further comprising documenting the presence of an anomaly if the detected radiation shows that the first radiation beam was scattered upon interacting with the top surface.

4. The method of claim 1, further comprising documenting the presence of an anomaly if the detected radiation shows that the second radiation beam was scattered upon interacting with the top surface.

5. The method of claim 1, further comprising comparing radiation detected from the first radiation beam to radiation detected from the second radiation beam to determine whether the anomaly comprises a COP or a particle.

6. The method of claim 1, wherein the first wavelength is around 266 nanometers.

7. The method of claim 1, wherein the first wavelength is around 355 nanometers.

8. The method of claim 1, wherein the first wavelength is a wavelength in the ultraviolet spectrum of radiation.

9. The method of claim 1, wherein the second wavelength is around 532 nanometers.

10. The method of claim 1, wherein the second wavelength is a wavelength in the visible spectrum of radiation.

11. The method of claim 1, wherein the first wavelength is around 266 nanometers and the second wavelength is around 532 nanometers.

12. The method of claim 1, wherein the first wavelength is around 355 nanometers and the second wavelength is around 532 nanometers.

13. The method of claim 1, wherein the first wavelength is in the ultra-violet spectrum of radiation and the second wavelength is in the visible spectrum of radiation.

14. (Amended) The method of claim 1, wherein the first angle is around 70 degrees to a normal direction to the top surface.

15. The method of claim 1, wherein the second angle is around zero degrees to a normal direction to the top surface.

16. The method of claim 1, wherein the directing of a first radiation beam and the directing of a second radiation beam are performed simultaneously.

17. The method of claim 1, wherein the detecting of radiation from the first radiation beam and the detecting of radiation from the second radiation beam are performed simultaneously.

18. The method of claim 1, wherein the first radiation beam comprises a laser beam.

19. The method of claim 1, wherein the second radiation beam comprises a laser beam.

20. The method of claim 1, wherein the detecting of radiation from the second radiation beam comprises detecting scattered radiation from the second radiation beam and avoiding reflected radiation from the second radiation beam.

21. The method of claim 2, further comprising documenting the presence of an anomaly if the detected radiation shows an increase in the amount of scattered radiation produced by the first radiation beam.

22. The method of claim 2, further comprising documenting the presence of an anomaly if the detected radiation shows an increase in the amount of scattered radiation produced by the second radiation beam.

23. <u>(Amended)</u> A method for detecting an anomaly on a top surface of a substrate, or within the substrate, comprising:

directing a first radiation beam having a first wavelength ~~at~~ <u>to illuminate a first spot on</u> the top surface of the substrate at a first <u>non-zero</u> angle measured from normal, wherein the first wavelength is in the ultraviolet spectrum of radiation;

directing a second radiation beam having a second wavelength ~~at~~ <u>to illuminate a second spot on</u> the top surface of the substrate at a second angle measured from normal, wherein the second wavelength is in the visible spectrum of radiation;

detecting radiation from the first and second radiation beams ~~scattered by the top surface in the first and second spots to provide a first single output in response to the scattered radiation in the first beam and a second single output in response to the scattered radiation in the second beam~~;

causing relative motion between the first and second radiation beams and the top surface of the substrate<u>, so that the spots scan paths on the top surface, wherein said detecting detects radiation scattered by the top surface in the first and second spots to provide a first single output in response to the scattered radiation in the first beam corresponding to a position of the first spot on the top surface in one of the scan paths, and a second single output in response to the scattered radiation in the second beam corresponding to a position of the second spot on the top surface in one of the scan paths</u>; and

documenting the presence of an anomaly if the detected radiation shows an increase in the amount of scattered radiation produced by the first radiation beam or the second radiation beam.

24. (Amended) A system for detecting an anomaly on a top surface of a substrate, or within the substrate, comprising:

a ~~radiation source operable to emit~~ device providing a first wavelength radiation and a second wavelength radiation to illuminate ~~a second spot on~~ the top surface, said first wavelength being ultraviolet or deep ultraviolet;

~~at least one objective operable to~~ optics focusing the first wavelength radiation into a first radiation beam at an oblique first angle to the top surface to illuminate a first spot on the top surface and ~~to~~ focusing the second wavelength radiation into a second radiation beam at a second angle to a normal direction to top surface to illuminate a second spot on the top surface;

means for causing relative motion between the first and second radiation beams and the top surface of the substrate, so that the spots scan paths on the top surface; ~~and~~

a detector mounted to detect radiation scattered by the top surface in the first or second spot to provide a first single output in response to the scattered radiation in the first beam corresponding to a position of the first spot on the top surface in one of the scan paths, and a second single output in response to the scattered radiation in the second beam corresponding to a position of the second spot on the top surface in one of the scan paths.

25. The system of claim 24, further comprising a beamsplitter to separate the first radiation beam from the second radiation beam.

26. (Amended) The system of claim 24, further comprising a collector that is rotationally symmetric about a line and that is operable to collect radiation and focus the radiation onto the detector.

27. The system of claim 24, wherein the radiation source is provided by a laser source.

28. The system of claim 24, wherein the first wavelength is around 266 nanometers.

29. The system of claim 24, wherein the first wavelength is around 355 nanometers.

30. Cancelled. ~~The system of claim 24, wherein the first wavelength is a wavelength in the ultraviolet spectrum of radiation.~~

31. The system of claim 24, wherein the second wavelength is around 532 nanometers.

32. The system of claim 24, wherein the second wavelength is a wavelength in the visible spectrum of radiation.

33. The system of claim 24, wherein the first wavelength is around 266 nanometers and the second wavelength is around 532 nanometers.

34. The system of claim 24, wherein the first wavelength is around 355 nanometers and the second wavelength is around 532 nanometers.

35. The system of claim 24, wherein the first wavelength is a wavelength in the ultraviolet spectrum of radiation and the second wavelength is a wavelength in the visible spectrum of radiation.

36. (Amended) The system of claim 25, further comprising at least one mirror mounted to direct the first radiation beam at the top surface ~~at a first angle measured from normal~~ and to direct the second radiation beam at the top surface ~~at a second angle measured from normal~~.

37. (Amended) The system of claim 25, wherein the first ~~angle~~ beam is around 70 degrees measured from a normal direction to the top surface.~~.~~

38. (Amended) The system of claim 25, wherein the second angle is around zero degrees from a normal direction to the top surface.

39. The system of claim 27, wherein the laser source is a solid-state laser.

40. The system of claim 27, wherein the laser source can vary the wavelength of emitted radiation using one or more crystals.

41. The method of claim 1, further comprising comparing radiation detected from the first radiation beam to radiation detected from the second radiation beam to determine whether the anomaly is located on the top surface or below the top surface of the substrate.

42. (Amended) A method for detecting an anomaly only on a top surface of a substrate, comprising:

directing a first ultraviolet radiation beam at the top surface of the substrate at a first angle measured from the normal direction to the top surface;

directing a second ultraviolet radiation beam at the top surface of the substrate at a second angle different from the first angle measured from the normal direction to the top surface;

detecting ultraviolet radiation from the first ultraviolet radiation beam; and

detecting ultraviolet radiation from the second ultraviolet radiation beam.

43. The method of claim 42, wherein the first and second ultraviolet radiation beams have a wavelength of around 266 nm.

44. The method of claim 42, wherein the first and second ultraviolet radiation beams have a wavelength of around 355 nm.

45. The method of claim 42, wherein the substrate comprises a silicon-on-insulator wafer.

46. (New) A method for detecting an anomaly on a surface of a substrate, or within the substrate, comprising:

directing a first radiation beam to illuminate a first spot on the surface of the substrate at an oblique angle to the surface, said first beam having a ultraviolet or deep first ultraviolet wavelength;

causing relative motion between the first radiation beam and the surface of the substrate so that the first beam scans a path on the surface; and

detecting radiation from the first radiation beam scattered by the surface in the spot to provide a single output in response to the scattered radiation in the beam corresponding to a position of the first spot on the surface in the scan path.

47.(New) The method of claim 46, wherein said causing causes rotational and translational relative motion between the first radiation beam and the surface of the substrate.

48. (New) The method of claim 46, further comprising directing a second radiation beam having a second wavelength to illuminate a second spot on the surface of the substrate at a second angle measured from the normal direction to the surface, wherein the second wavelength is not equal to the first wavelength.

49. (New) The method of claim 48, further comprising comparing radiation detected from the first radiation beam to radiation detected from the second radiation beam to determine whether the anomaly comprises a COP or a particle.

50. (New) The method of claim 48, wherein the second wavelength is around 532, 266 or 355 nanometers.

51. (New) The method of claim 48, wherein the second wavelength is a wavelength in the visible spectrum of radiation.

52. (New) The method of claim 48, wherein the first wavelength is around 266 or 355 nanometers and the second wavelength is around 532 nanometers.

53. (New) The method of claim 48, wherein the first wavelength is in the ultra-violet spectrum of radiation and the second wavelength is in the visible spectrum of radiation.

54. (New) The method of claim 48, wherein the second angle is around zero degrees.

55. (New) The method of claim 48, wherein the directing of a first radiation beam and the directing of a second radiation beam are performed sequentially or simultaneously.

56. (New) The method of claim 48, wherein the detecting of radiation from the first radiation beam and the detecting of radiation from the second radiation beam are performed simultaneously.

57. (New) The method of claim 48, wherein the detecting of radiation from the second radiation beam comprises detecting scattered radiation from the second radiation beam and avoiding reflected radiation from the second radiation beam.

58. (New) The method of claim 48, further comprising documenting the presence of an anomaly if the detected radiation shows an increase in the amount of scattered radiation produced by the second radiation beam.

59. (New) The method of claim 48, wherein said directing directs the second beam to a low-k dielectric material, said second beam containing a wavelength in a visible range.

60. (New) The method of claim 48, further comprising comparing radiation detected from the first radiation beam to radiation detected from the second radiation beam to determine whether the anomaly is located on the top surface or below the top surface of the substrate.

61. (New) The method of claim 48, wherein the relative motion causes the second radiation beam to scan a path on the surface, said method further comprising registering the scan paths of the spots illuminated by the first and second radiation beams.

62. (New) The method of claim 46, further comprising documenting the presence of an anomaly if the detected radiation shows an increase in the amount of scattered radiation produced by the first radiation beam.

63. (New) The method of claim 46, wherein the first beam is at an angle of around 70 degrees from a normal direction to the surface.

64. (New) The method of claim 46, further comprising collecting radiation from the first radiation beam scattered by the surface in the spot by means of a radiation collector having an axis of rotational symmetry about a line, said collector focusing scattered radiation from the surface to the detector to produce the single output.

65. (New) The method of claim 46, wherein said directing directs the beam to the surface of a silicon-on-insulator wafer, and the detecting detects radiation scattered by the silicon-on-insulator wafer.

66. (New) The method of claim 46, wherein said directing directs the beam to the surface of an unpatterned semiconductor wafer.

67. (New) An apparatus for detecting an anomaly on a surface of a substrate, or within the substrate, comprising:

optics directing a first radiation beam to illuminate a first spot on the top surface of the substrate at an oblique angle to the surface, said first beam having a ultraviolet or deep first ultraviolet wavelength;

means for causing relative motion between the first radiation beam and the surface of the substrate so that the first beam scans a path on the surface; and

a detector detecting radiation from the first radiation beam scattered by the surface in the spot to provide a single output in response to the scattered radiation in the beam corresponding to a position of the first spot on the surface in the scan path.

68. (New) The apparatus of claim 67, wherein said causing means comprises an instrument that causes rotational and translational relative motion between the first radiation beam and the surface of the substrate.

69. (New) The apparatus of claim 67, further comprising means for directing a second radiation beam having a second wavelength to illuminate a second spot on the surface of the substrate at a second angle measured from the normal direction to the surface, wherein the second wavelength is not equal to the first wavelength.

70. (New) The apparatus of claim 69, further comprising means for comparing radiation detected from the first radiation beam to radiation detected from the second radiation beam to determine whether the anomaly comprises a COP or a particle.

71. (New) The system of claim 69, further comprising a beamsplitter to separate the first radiation beam from the second radiation beam.

72. (New) The system of claim 69, wherein the first wavelength is around 266 or 355 nanometers and the second wavelength is around 532 nanometers.

73. (New) The system of claim 69, wherein the first wavelength is a wavelength in the ultraviolet spectrum of radiation and the second wavelength is a wavelength in the visible spectrum of radiation.

74. (New) The system of claim 73, further comprising at least one mirror mounted to direct the first radiation beam at the surface at a first angle measured from normal and to direct the second radiation beam at the surface at a second angle measured from normal.

75. (New) The system of claim 69, wherein the second angle is around zero degrees.

76. (New) The system of claim 67, further comprising a collector having an axis of rotational symmetry about a line, said collector receiving and directing scattered radiation to the detector to produce the single output.

77. (New) The system of claim 67, wherein the optics comprises a laser source.

78. (New) The system of claim 67, wherein the first wavelength is around 266 or 355 nanometers.

79. (New) The system of claim 67, wherein the first beam is at an angle of around 70 degrees from a normal direction to the surface.

80. (New) The system of claim 67, wherein the optics comprises a solid-state laser.

81. (New) A method for detecting an anomaly on a surface of a substrate comprising a low k dielectric material, or within the substrate, comprising:

directing a first radiation beam having a first wavelength to illuminate a first spot on the surface of the substrate at a first angle measured from the normal direction to the surface;

directing a second radiation beam having a second wavelength to illuminate a second spot on the surface of the substrate at a second angle measured from the normal direction to the surface, wherein the two beams reach the low k dielectric material, and wherein the two wavelengths are not equal and are in a visible range;

detecting radiation from the first radiation beam scattered by the top surface in the first spot; and

detecting radiation from the second radiation beam scattered by the top surface in the second spot.

82. (New) The method of claim 81, further comprising causing relative motion between the first and second radiation beams and the surface of the substrate so that the beams scan paths on the surface, wherein the detecting detects radiation from the first radiation beam scattered by the surface in the first spot to provide a first single output in response to the scattered radiation in the first beam corresponding to a position

of the first spot on the surface in one of the scan paths, and to provide a second single output in response to the scattered radiation in the second beam corresponding to a position of the second spot on the surface in one of the scan paths.

83. (New) The method of claim 23, wherein said directing directs the beam to the surface of a silicon-on-insulator or unpatterned semiconductor wafer, and the detecting detects radiation scattered by the silicon-on-insulator or unpatterned semiconductor wafer.

84. (New) The method of claim 1, wherein said directing directs the beam to the surface of an unpatterned semiconductor wafer.

85. (New) The method of claim 1, further comprising registering the scan paths of the spots illuminated by the first and second radiation beams.